

The drawing given in the *Phil. Trans.* 1861, Pl. XXVIII. fig. 26, conveys a good idea of the form of the northern half of the nebula.

The photograph clearly confirms Lord Rosse that it is one, and not two nebulae, and the four stars shown in his drawing are in the positions he indicates; two of them are very faint, and it is remarkable that he did not see the three other stars involved, which the photograph shows to be much brighter than the two he refers to. There is a bright star in the centre of the figure, with dense nebulosity on the *south following* side of it, and five fairly well defined stars are involved in the dense nebulosity of the bright *north following* half of the nebula, the end of which is, like a hook, turned towards the *south following* side. The *south preceding* half of the nebula is much fainter, and spreads out wider, than the other half, and there are some nebulous structures and three very faint star-like condensations in it. The nebula seems as if it were assuming a spiral form, and that there had been a collision on the *north following* half, with the effect of closing together the nebulous mass and forcing part of it in the *south following* direction.

Photograph of the Nebulae M 65, 66 and H V. 8 Leonis.

By Isaac Roberts, D.Sc., F.R.S.

The photograph of the nebulae M 65, 66 and H V. 8 *Leonis*, R.A. 11^h 14^m, Decl. 13° 50' north, was taken with the 20-inch reflector on 1894 February 28, with exposure of the plate during three hours forty minutes, and the copy now presented is enlarged to the scale of 1 millimetre to 24 seconds of arc.

The Nebula M 65, New General Catalogue, 3,623, General Catalogue, 2,373,

is described by Sir J. Herschel as bright, very large, much extended in the direction $165^\circ \pm$, gradually brighter in the middle, with a nucleus; eight observations were made. In the *Phil. Trans.* for 1833, Pl. XIV. fig. 53, he gives a drawing, but it does not compare well with the photograph.

Lord Rosse (*Phil. Trans.* 1850, Pl. XXXVII. fig. 7) gives a drawing of the nebula, and on p. 512 states that it is resolvable, a spiral or an annular arrangement about it, no other portion resolved; and in the *Observations of Nebulae and Clusters of Stars*, p. 95, he gives the results of eight observations made between the years 1849 and 1861, and states that he suspected seeing, at times, dark spaces on either side of the nucleus, and some mottling and stars sparkling in it. He also saw a star close *following* the nucleus, but did not see the curious ring which, he says, Sir J. Herschel saw.

Lassell (*Mem. R.A.S.* vol. xxxv. p. 43, and Pl. III. fig. 15) describes the nebula as faint, irregular, and formless, and suspected that he saw some stars in it. The drawing does not resemble the photograph.

The photograph shows the nebula to be a symmetrical ellipse with a well-defined stellar nucleus surrounded by dense nebulosity, in the midst of which is a spiral ring filled with nebulosity; and this, together with the nuclear condensations, are surrounded with two elliptical rings of nebulosity separated by a dark space. Five star-like condensations of nebulosity are involved in the rings, and one bright star is in the dark space between the rings on the *south following* side of the nucleus. The whole nebula is even more symmetrical than the Great Nebula in *Andromeda*, and is clearly of that type; but I have not before seen a spiral with a stellar nucleus, both of which are involved in the dense central nebulosity.

The Nebula M 66, New General Catalogue, 3,627, General Catalogue, 2,377,

is described by Sir J. Herschel as bright, very large, much extended in the direction 150° , much brighter in the middle, two stars *n. p.*, nine observations made. In the *Phil. Trans.* 1833, Pl. XIV. fig. 54, a drawing of it is given which in outline resembles the photograph, but the elongation is in the direction of about 180° .

Lord Rosse (*Observations of Nebulæ and Clusters of Stars*, p. 95) describes it as a spiral, well resolved about the nucleus, but no other part, two stars involved in it, with others and knots of nebulosity suspected; could not resolve the nucleus. A marginal sketch is given and a drawing in the *Phil. Trans.* 1861, Pl. XXVII. fig. 16, where some spirals are shown, but the resemblance to the photograph is not evident. Eleven observations were made between the years 1848 and 1857.

The photograph shows the nebula to be an imperfect spiral with a well-defined stellar nucleus which forms the pole of the convolutions, involved in which I counted fourteen nebulous and star-like condensations. They are all involved in what appears suggestive of a state of transition into the perfect form of spiral nebulæ, several of which have been photographed, and some of them presented to the Society.

The Nebula H V. 8, New General Catalogue, 3,628, General Catalogue, 2,378,

is described by Sir J. Herschel as pretty bright, very large, very much extended in the direction 102° ; and in the *Phil. Trans.* for 1833, Pl. XIV. fig. 51, a drawing is given, but it does not resemble the photograph.

Lord Rosse (*Observations of Nebulæ and Clusters of Stars*,

p. 95, and Pl. III. fig. 8) describes and delineates the nebula as pretty bright, extended, split into two parallel rays, the split extending its whole length, the *following* part being partially filled with faint nebulosity. Eight observations were made between the years 1848 and 1866. The drawing well represents the greater part of the nebula.

The photograph shows it like a nebulous ring viewed edge-wise, with a large dense central condensation, and that the ring along its periphery is divided into two parts parallel with each other by a broad dark band, or ring, which shuts from view the light of the central condensation. The two extremities of the diameter of the supposed nebulous ring show expansions of the nebulosity, and there are two stars apparently involved in the faint nebulosity at the *south following* extremity.

I may add that the time is approaching, if it has not already arrived, when discussion concerning the developments of these gigantic celestial bodies may be profitably undertaken, for reliable evidence showing their forms and structures is rapidly accumulating.

The existing classification of the nebulae into bright, faint, very faint, very large, &c., is much too indefinite a description of the objects as they are now depicted to us by photography. They will require a classification which will define the principal characteristics of their forms, structure, brightness, and their spectra.

Remarks on Dr. Roberts's Photographs of Star Clusters.

By E. B. Knobel.

In considering the photographs of Star Clusters which have been presented to the Society from time to time by Dr. Roberts, I have been repeatedly struck by the great difference in the appearance of the object in the photograph compared with the view in the telescope. Stars which were conspicuous in eye observation did not show the same prominence in the photograph, and the great variation of magnitude in stars in the same field of view was not apparent. At first I was inclined to consider this anomaly as due to the long exposure employed, which brought upon the photographic plate a vast number of stars not discernible to the eye, and thus the configuration and general appearance so familiar in the telescope might be masked; but this explanation seemed hardly to be borne out by more minute examination. The fact seemed evident that, so far from these photographs showing the stars in their true relative magnitude, as has been claimed, there is an untrue and unnatural uniformity in the magnitudes which required investigation.

At the last meeting of the Society Dr. Roberts exhibited a photograph of the nebula 74 Piscium, with which object I was